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Economic Analysis of the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations

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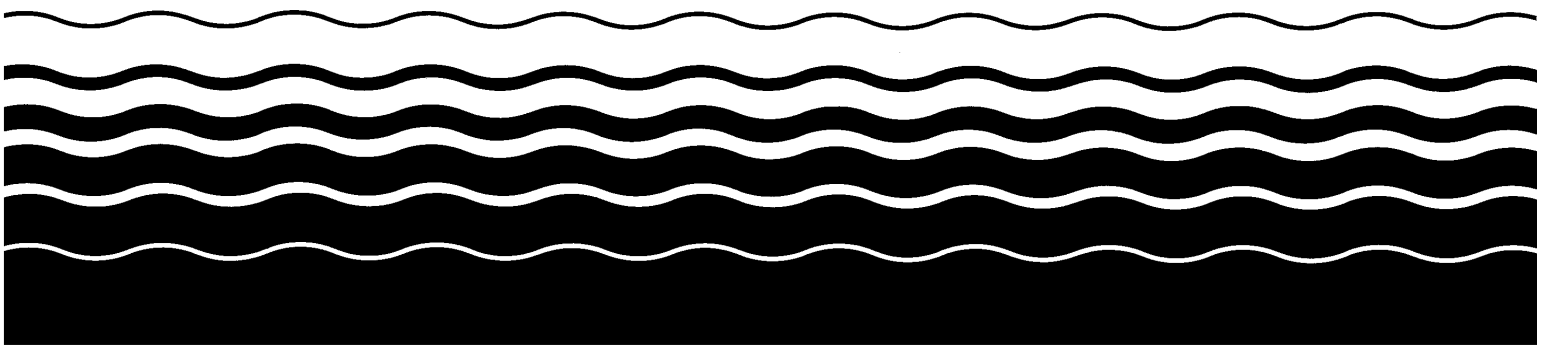

Economic Analysis of the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations

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ACRONYMS

AFO	animal feeding operation
ARMS	Agricultural Resource Management Study
ASAE	American Society of Agricultural Engineers
AU	animal unit
BAT	Best Available Technology
BATEA	Best Available Technology Economically Achievable
BLS	Bureau of Labor Statistics
BMP	best management practice
BNR	biological nutrient removal
BOD	biological oxygen demand
BPJ	best professional judgment
C-E	cost-effectiveness
CAFO	concentrated animal feeding operation
CARD	Center for Agriculture and Rural Development
CC/Q	compliance costs per unit sold
CCI	Construction Cost Index
CE	Central
COD	chemical oxygen demand
CWA	Clean Water Act
DCF	discounted cash flow
EA	economic analysis
EBITDA	earnings before interest, taxes, depreciation, and amortization
ELG	effluent limitations guidelines
EMS	environmental management system
EO	Executive Order
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
ERS	Economic Research Service
FAPRI	Food and Agricultural Policy Research Institute
FF	farrow-finish and farrowing
FFSC	Farm Financial Standards Council
FRFA	final regulatory flexibility analysis
FTE	full-time equivalent
GDP	Gross Domestic Product
GF	grow-finish
ICR	Information Collection Request
IRFA	initial regulatory flexibility analysis
IRS	Internal Revenue Service
LCBP	Lake Champlain Basin Program
MA	Mid-Atlantic
MACRS	Modified Accelerated Cost Recovery System
MW	Midwest
NAICS	North American Industry Classification System
NASS	National Agricultural Statistics Service
NCBA	National Cattlemen's Beef Association
NCSU	North Carolina State University
NEWWT	Northeast Wisconsin Waters for Tomorrow, Inc.
NFI	net farm income
NMPF	National Milk Producers Federation
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPPC	National Pork Producers Council
NRCS	Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NSPS	New Source Performance Standards
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
PA	Pacific
POTW	publicly owned treatment works
RFA	Regulatory Flexibility Act

RIMS II	Regional Input-Output Modeling System
SBA	Small Business Administration
SBAR	Small Business Advisory Review
SBREFA	Small Business Regulatory Enforcement Fairness Act
SER	Small Entity Representative
SIC	Standard Industrial Classification
SO	South
TIAER	Texas Institute for Applied Environmental Research
TSS	total suspended solids
TWF	toxicity weighting factor
UMRA	Unfunded Mandates Reform Act
USDA	United States Department of Agriculture
WASDE	World Agricultural Supply and Demand Estimates
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) is revising and updating the two primary regulations that ensure that manure, wastewater, and other process waters generated by concentrated animal feeding operations (CAFOs) do not impair water quality. EPA's final regulatory changes affect the existing National Pollutant Discharge Elimination System (NPDES) provisions and the existing effluent limitations guidelines (ELG) for "feedlots." The NPDES provisions define and establish permit requirements for CAFOs, and the ELG establish the technology-based effluent discharge standard that is applied to CAFOs. Existing regulations were originally promulgated in the 1970s. EPA is revising the regulations to address changes that have occurred in the animal industry sectors over the past 25 years, to clarify and improve implementation of CAFO requirements, and to improve the environmental protection achieved under these regulations. Final revisions to the NPDES and ELG regulations are referred to in this report as the final CAFO regulations.

On January 12, 2001, EPA published a proposal to revise and update these regulations (66 FR 2959), referred to in this report as the "2001 Proposal." The Economic Analysis that supports the 2001 Proposal contains information on EPA's estimates of the cost, financial effects, and monetized benefits of the proposed revisions. That analysis, titled *Economic Analysis of the Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations*, is referred to in this report as the "Proposal EA" (USEPA, 2001a). EPA also published two Notices of Data Availability in the Federal Register (66 FR 58556 and 67 FR 48099). These Notices present new data and information EPA has received since the 2001 Proposal, soliciting further public review and comment.

The revisions EPA is promulgating affect who must apply for a permit under the NPDES program, who is subject to the ELG, and what the ELG requires. A summary of the current, proposed, and final NPDES and ELG regulations for CAFOs is presented in Section 1 of this report. See Section 4 of the final rule preamble for a discussion of the final regulations.

This Economic Analysis (EA) summarizes EPA's analysis of the estimated annual compliance costs and the economic impacts that may be incurred by affected operations that are subject to the final revisions. Additional information on the regulatory alternatives considered by EPA for the 2001 Proposal are presented in the EA supporting the proposed regulations (USEPA, 2001a). The report covers financial impacts to CAFOs, potential impacts on processors of livestock and poultry products, and market and other secondary impacts such as impacts on prices, quantities, trade, employment, and output. It also responds to requirements for small business analyses under the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) and for cost-benefit analyses under Executive Order 12866 and the Unfunded Mandates Reform Act (UMRA).

This EA summarizes EPA's analysis of the estimated annual compliance costs and the economic impacts that may be incurred by affected operations that are subject to the final revisions. EPA also provides additional material on the final CAFO regulations in the *Development Document for the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations*, which discusses how the Agency estimated the compliance costs of the final regulations. EPA's detailed benefit analysis, titled *Environmental and*

Economic Benefit Analysis of the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations, provides information about existing water quality impairments associated with animal production operations and estimates the extent to which these impairments might be mitigated by the final CAFO regulations.

ES.2 DATA AND METHODOLOGY

ES.2.1 Data Sources

EPA did not conduct an industry-wide survey of all CAFOs. Rather, the Agency is relying on existing data sources and expertise provided by numerous government agencies, state agricultural extension service agencies, and land grant universities, as well as information from industry trade associations, agricultural professionals, and environmental groups. This data collection effort is described in the 2001 Proposal (66 FR 2960) and detailed in the Proposal EA. Major data sources are discussed in detail where they are used to conduct the analyses presented in this report or reference other supporting documents in the rulemaking record.

For its engineering cost analysis, EPA uses industry and cost information from various sources, including USDA, the land grant universities, state agricultural extension agencies, and industry. EPA uses these data to develop its model CAFOs and to extrapolate CAFO level costs to all operations nationwide. A key source of data used to estimate compliance costs and economic impacts on the regulated community is the 1997 Census of Agriculture. The Census is conducted by the National Agricultural Statistical Service (NASS) every five years and provides information on the number of feedlots, their geographic distributions, the amount of cropland available to land apply animal manure generated from animal confinement operations, and other information. These data are compiled by NASS, with the assistance of personnel at USDA's Natural Resources Conservation Service (NRCS), who developed a methodology to identify information specific to animal confinement operations. All Census data provided to other government agencies, including EPA, are aggregated to preserve confidential business information. As detailed in the 2001 Notice, EPA has received additional data and information since proposal that have been incorporated into the Agency's analysis for the final regulations. EPA's *Development Document* supporting the proposed and final rule (USEPA, 2001 and 2002) presents the Census data used along with other USDA data and other source data that EPA uses for its cost analysis.

For EPA's economic impact analysis, the Agency obtained financial data for livestock and poultry operations from a variety of sources, including USDA, the land grant universities, and industry. EPA uses these data to depict baseline financial conditions at representative model CAFOs and to extrapolate CAFO level impacts to all operations nationwide. As detailed in both the 2001 Notice and the 2002 Notice, EPA received additional data and information since proposal that have been incorporated into the Agency's analysis for the final regulations. To assess broader market changes from the CAFO regulations, EPA compiled additional industry and market data from a wide range of USDA data and land grant university research. A detailed summary of the data and citations of the sources of these data are provided in the Proposal EA, supplemented by data and other information presented in this report.

A key source of financial data is USDA's Agricultural Resource Management Study (ARMS). This study is compiled by NASS and USDA's Economic Research Service (ERS) and provides complete

financial accounting data for U.S. farms for each of the major commodity sectors affected by the final CAFO regulations. These data are used to depict farm financial conditions and to evaluate regulatory impacts. ERS provided data for representative farms that were obtained through special tabulations of the available survey data, conducted by ERS, that differentiate the financial conditions among operations by commodity sector, facility size (number of animals onsite), and major farm producing region. As with the Census data, USDA aggregated these data in a manner that preserves both the statistical representativeness and confidentiality of the respondent survey data. EPA also obtained financial data from various land grant universities, including enterprise budgets that portray financial conditions for an operation's livestock or poultry enterprise. In particular, the University of Missouri's Food and Agricultural Policy Research Institute (FAPRI) submitted financial data for several sectors that had been collected as part of their evaluation of EPA's Proposal EA. EPA also obtained financial data from the National Cattlemen's Beef Association (NCBA) based on a survey of its membership to obtain financial statistics specific to cattle feeding operations. Section 2.3 and other sections of this report discuss these data in more detail and describe how these data sources contribute to EPA's analyses.

ES.2.2 Methodology

EPA assessed financial effects on regulated CAFOs based on predicted changes to select financial criteria. The economic model that EPA used to evaluate financial impacts on CAFOs uses a representative farm approach. Under this general framework, EPA constructed a series of model facilities ("model CAFOs") that reflect EPA's estimated compliance costs and readily available financial data. EPA used these model CAFOs to develop an average characterization for a group of operations based on certain distinguishing characteristics for each sector, such as facility size and production region, that can be shared across a broad range of facilities.

EPA developed two sets of models for determining economic impacts at animal confinement operations—cost models and financial models. EPA evaluated compliance costs based on more than 170 farm level cost models that were developed to depict conditions at and to evaluate compliance costs for select representative CAFOs. The cost models are differentiated by commodity sector, farm production region, facility size, and land availability for application of manure. EPA's cost models provide the estimated compliance costs, which are compared to corresponding financial models that characterize financial conditions across different types of operations. (Like the cost models, the financial models are also differentiated by sector, facility size, and production region.) Economic impacts under a post-regulatory scenario are approximated by extrapolating the average impacts for a given model CAFO across the larger number of operations that share similar production characteristics and are identified by that CAFO model. A summary of this overall approach is provided in Section 2.

For the purpose of estimating the costs that would be incurred by CAFOs to comply with the regulations, EPA estimated costs associated with four broad cost components: nutrient management planning, facility upgrades, land application, and technologies for balancing on-farm nutrients. Nutrient management planning costs include manure and soil testing, record-keeping, and plan development. Facility upgrades reflect costs for additional or improved manure storage, mortality handling, runoff controls, reduction of fresh water use where appropriate, and additional farm management practices. Land application costs address agricultural application of nutrients, including hauling of excess manure off-site and adjusting for changes in commercial fertilizer needs, and reflect differences among operations based on cropland availability for manure application.

EPA evaluated compliance costs using a representative facility approach based on approximately 1,600 farm level cost models to depict conditions and to evaluate compliance costs for select representative CAFOs. The major factors used to differentiate individual model CAFOs include the commodity sector, the farm production region, and the facility size (based on herd or flock size or the number of animals on-site). EPA's model CAFOs primarily reflect the major animal sector groups, including beef cattle, dairy, hog, broiler, turkey, and egg laying operations. Practices at other subsector operations are also reflected in the cost models, such as replacement heifer operations, veal operations, flushed-cage layers, and hog grow-finish and farrow-finish facilities.

Another key distinguishing factor incorporated into EPA's cost models is information on the availability of cropland and pastureland for land application of manure nutrients. For this analysis, nitrogen and phosphorus rates of land application were evaluated for three categories of cropland availability: (1) CAFOs with sufficient cropland for all manure generated on-site; (2) CAFOs with some, but not enough, cropland to accommodate all of the manure produced at the facility; and (3) CAFOs with no cropland. EPA used USDA data to determine the number of CAFOs within each of these categories. This information takes into account which nutrient (nitrogen or phosphorus) is used as the basis to assess land application and nutrient management costs. Additional information on this costing approach is provided in Section 2 of this report.

For the purpose of estimating costs and financial effects to CAFOs with between 300 and 1,000 AU, EPA assumes that costs that will be incurred by those sized operations to comply with BPJ-based limitations under the revised NPDES regulations are similar to the estimated costs that would be incurred if operations with between 300 and 1,000 AU had to comply with the ELG.

To estimate the impacts of the final regulations, EPA examined the economic effects on regulated CAFOs and national markets. Estimated financial impacts on regulated entities cover both existing and new CAFOs that will be affected by the final regulations. Results presented here focus on economic effects from the CAFO regulations affecting CAFOs with more than 1,000 AU because only large facilities will be subject to the effluent guidelines and NSPS. EPA's analysis also presents the estimated effects on existing operations that are small businesses.

EPA evaluated the economic achievability of the rule on existing operations based on changes in representative financial conditions across three financial criteria: (1) an initial screening comparing incremental post-tax costs to total gross revenue ("sales test"), (2) projected post-compliance cash flow over a 10-year period ("discounted cash flow analysis"), and (3) an assessment of an operation's debt-to-asset ratio under a post-compliance scenario ("debt-asset test").

EPA used the results from these analyses to divide affected CAFOs into three financial impact categories: Affordable, Moderate, and Stress. CAFOs experiencing affordable or moderate impacts are considered to have some financial impact on operations, but EPA does not expect the costs of complying with this rule to make these operations vulnerable to closure. EPA considers that for CAFOs in both the "Affordable" and "Moderate" impact categories the final requirements are likely to be economically achievable. Operations experiencing financial stress, however, are considered to be vulnerable to closure because of the costs of this rule. EPA considers that for CAFOs in the "Stress" impact category, the final requirements are likely not economically achievable. EPA believes that there may be mitigating factors that could reduce the number of facilities experiencing financial stress, such as the availability of cost-share assistance and long-run market adjustment.

EPA conducted its analysis first at the farm level based on data reflecting financial conditions for the entire farm operation (e.g., reflecting income and cost information spanning the entire operation, thus considering the operation's primary livestock production, along with other income sources such as secondary livestock and crop production, government payments, and other farm-related income). Based on the farm level results, EPA also assessed the financial effects on CAFOs at the enterprise level (e.g., limiting the scope of the assessment to the operation's livestock or poultry enterprise, and excluding other non CAFO-related sources of income from the analysis). By evaluating the financial criteria at both the farm level and the enterprise level, EPA's analyses address comments expressed by many commenters, including FAPRI, other land grant university researchers, and industry, as well as USDA.

Starting with the farm level analysis, EPA considers the regulations to be economically achievable for a representative model CAFO if the average operation has a post-compliance sales test estimate within an acceptable range, a positive post-compliance cash flow over a 10-year period, and a post-compliance debt-to-asset ratio not exceeding a benchmark value. Specifically, if the sales test shows that compliance costs are less than 3 percent of sales, or if post-compliance cash flow is positive and the post-compliance debt-to-asset ratio does not exceed a benchmark (depending on the baseline data) and compliance costs are less than 5 percent of sales, EPA considers the options to be "Affordable" for the representative CAFO group. (Although a sales test result of less than 3 percent does indicate "Affordable" in the farm level analysis, further analysis is conducted to determine the effects at the operation's livestock or poultry enterprise.) The benchmark values assumed for the debt-asset test are sector-specific. EPA assumes a 70 percent benchmark value for the debt-asset test to indicate financial stress in the hog and dairy sectors, and an 80 percent benchmark for the debt-asset test to indicate financial stress in the beef cattle sector. These benchmark values address public comment received and alternative debt and asset data submitted for the livestock sectors. For the poultry sectors, however, EPA did not obtain alternative debt and asset data and continues to evaluate data used for proposal against a 40 percent benchmark value.

A sales test of greater than 5 percent but less than 10 percent of sales with positive cash flow and a debt-to-asset ratio of less than these sector-specific debt-asset benchmark values is considered indicative of some impact at the CAFO level, but at a level not as severe as those indicative of financial distress or vulnerability to closure. These impacts are labeled "Moderate" for the representative CAFO group. EPA considers both the "Affordable" and "Moderate" impact categories to be economically achievable by the CAFO, subject to the enterprise analysis (see below). If, with a sales test of greater than 3 percent, post-compliance cash flow is negative or the post-compliance debt-to-asset ratio exceeds these sector-specific debt-asset benchmarks, or if the sales test shows costs equal to or exceeding 10 percent of sales, EPA considers the final regulations to be associated with potential financial stress for the entire representative CAFO group. In such cases, each of the operations represented by that group might be vulnerable to closure. For operations that are determined to experience financial "Stress" at the farm level, the final requirements are likely not economically achievable.

The enterprise level analysis builds on the farm level analysis, evaluating effects at a farm's livestock or poultry enterprise. If the farm level analysis shows that the regulations impose "Affordable" or "Moderate" effects on the operation, the enterprise level analysis is conducted to determine whether the enterprise's cash flow is able to cover the cost of regulations. This analysis uses a discounted cash flow approach similar to that used to assess the farm level effects, in which the net present value of cash flow is compared to the net present value of the total cost of the regulatory options over the 10-year time frame of the analysis. Over the analysis period, if an operation's livestock or poultry enterprise maintains a cash flow stream that both exceeds the cash costs of the rule (operating and maintenance

costs plus interest) and covers the net present value of the principal payments on the capital, EPA concludes that the enterprise will likely not close because of the CAFO rule. This analysis is conducted on a pass/fail basis. If the net present value of cash flow minus the net present value of the rule's costs is greater than zero, the enterprise passes the test and the enterprise is assumed to continue to operate. EPA considers these results to indicate that the final requirements are economically achievable. If the net present value of cash flow is not sufficient to cover the net present value of the cost of the rule, EPA assumes that the CAFO operator would consider shutting down the livestock or poultry enterprise. That is, if an operation fails the enterprise level analysis, these operations are determined to experience financial "Stress" and the final requirements are likely not economically achievable.

In response to comments, EPA conducted additional supplemental analysis to determine the effects of the regulation under two different scenarios. One scenario takes into consideration the effects of long-run market adjustment following implementation of the final regulations. This analysis is conducted using simulated changes in producer revenue given changes in market prices as depicted by EPA's market model, which uses estimates of price and quantity response in these markets. A second scenario takes into consideration potential cost share assistance under Federal and State conservation programs, assuming that a portion of costs are covered by cost sharing subject to programmatic constraints. Given the uncertainty of whether CAFO income will rise in response to long-run market adjustment or whether available cost share dollars will effectively offset compliance costs at regulated CAFOs, EPA's analysis to determine whether the regulation is "economically achievable" does not rely on such assumptions as part of its regulatory analysis and therefore reflects the highest level of impacts projected. However, EPA presents the results of this analysis assuming both some degree of cost passthrough and no cost passthrough, as well as some degree of cost share assistance and no cost share assistance, along with the results of its lead analysis. More information on this decision framework is provided in Section 2.

EPA's market analysis evaluates the effects of the final regulations on national markets. This analysis uses a linear partial equilibrium model adapted from the COSTBEN model developed by USDA's Economic Research Service. The modified EPA model provides a means to conduct a long-run static analysis to measure the market effects of the final regulations in terms of predicted changes in farm and retail prices and product quantities. Market data used as inputs to this model are from a wide range of USDA data and land grant university research. Once price and quantity changes are predicted by the model, EPA uses national multipliers that relate changes in sales to changes in total direct and indirect employment and also to national economic output. These estimated relationships are based on the Regional Input-Output Modeling System (RIMS II) from the U.S. Department of Commerce. The details of the market analysis are described in Section 2 and also in the Proposal EA.

Additional information on how EPA developed the cost models is provided in the *Development Document*. See also EPA's detailed responses to public comments received on proposal and both Notices of Data Availability published on this rule. These comments and the Agency's response are in the Comment Response Document that is available in the rulemaking record.

ES.3 REGULATED COMMUNITY

The animal sectors covered in this analysis include the cattle, veal, heifer, dairy, hog, broiler, egg layer, and turkey sectors. Not all confinement operations (animal feeding operations or AFOs) in these sectors may be CAFOs and thus subject to the final regulations. Table ES-1 presents the estimated

number of operations that would be defined or designated as a CAFO under the final revisions. CAFOs in the 300 to 1,000 animal units (AU)[1] size category that EPA expects would be defined as CAFOs under the existing NPDES regulation are labeled in table as "Status Quo."

Section 2 of the Proposal EA (USEPA, 2001a) presents more detailed information on the regulated community, including a profile of the various CAFO sectors and meat and poultry processors.

Table ES-1. Number of Potential Operations *Defined* or *Designated* as CAFOs (1997)

Sector	Total Operations Defined as CAFOs		
	>1,000 AU	300-1,000 AU "Status Quo"	Designated CAFOs <1,000 AU
	(number of operations)		
Cattle	1,766	174	15
Veal	12	230	0
Heifers	242	7	3
Dairy	1,450	1,949	30
Hogs	3,924	1,485	52
Broilers	1,632	520	52
Layers-dry	729	26	8
Layers-wet	383	24	2
Turkeys	388	37	10
Total CAFOs	**10,526**	**4,452**	**172**

Source: USEPA (see Section 3). "Layers: wet" are operations with liquid manure systems. "Layers: dry" are operations with dry systems. Number of designated facilities shown over 5 year period.

ES.4 ANNUAL INCREMENTAL COSTS

ES.4.1 Costs to Regulated CAFOs

EPA estimates the annual incremental costs of compliance using the capital and recurring costs derived in the *Development Document*. EPA converts these costs to incremental annualized costs, as described in Appendix A. Annualized costs better describe the actual compliance costs that a model

[1] As defined for the final CAFO regulations, one animal unit (AU) is equivalent to one slaughter or feeder cattle, calf or heifer; 0.7 mature dairy cattle; 2.5 hogs (over 55 pounds) or 5 nursery pigs; 55 turkeys; 30 egg-laying chickens (where a wet manure management system is used), and 125 broilers and 82 egg-laying chickens, regardless of the animal waste system used.

CAFO would incur, allowing for the effects of interest, depreciation, and taxes. EPA uses these annualized costs to estimate the total annual compliance costs and to assess the economic impacts of the final requirements to regulated CAFOs by taking the annualized costs for each CAFO model and aggregating them on the basis of the number of affected CAFOs represented by each model. Section 2 and Appendix A provide more details on the cost annualization methodology and results.

This EA presents the results of two technology options where EPA has estimated the cost of land application based on nitrogen-based application rates only (Option 1) and also the cost of land application based on nitrogen-based application rates, except in those instances where EPA believes that phosphorus-based rates are likely to be appropriate (Option 2). The final rule specifies that the determination of application rates is to be based on the technical standards established by the Director and EPA expects that these standards will require phosphorus-based application, where appropriate. The rule also provides for these standards to include appropriate flexibilities in the use of phosphorus-based rates, such as multi-year phosphorus application, but the potential costs savings resulting from these flexibilities are not reflected in the analysis. As a result, the cost and economic impacts of this rule may have been overestimated.

EPA evaluated the costs of these technology options for all operations defined as CAFOs with more than 1,000 AU and for those operations that are defined as CAFOs with between 300 and 1,000 AU. EPA calculates these costs using the data and approaches described in the *Development Document* (USEPA, 2002) and in Section 2 of this report. For the purpose of estimating total regulatory costs of the final CAFO regulations, EPA assumes that the individual per-CAFO costs to comply with the effluent guideline regulations are similar to the costs that will be incurred by operations with between 300 and 1,000 AU to comply with the revised NPDES requirements (although these smaller-sized operations will be subject to BPJ and not the ELG requirements). These cost estimates, therefore, may further be overstated for this size category.

Table ES-2 summarizes EPA's estimates of the total annualized costs to existing CAFOs due to the regulations. The table shows these costs broken out by sector and broad facility size category. Results are shown for both Option 1 and Option 2. As shown in the table, EPA estimates the total estimated costs to CAFOs range from $141 million (Option 1) to $326 million annually (Option 2), expressed as pre-tax, 2001 dollars. Roughly one-half of this cost is incurred by the dairy sector, with another roughly 30 percent incurred within the cattle sectors (including the beef, veal, and heifer sectors). (Total estimated social costs include an additional $9 million to Federal and State governments; see Section 5.)

Of this total, EPA estimates that the cost to operations with more than 1,000 AU range from $119 million (Option 1) to $273 million annually (Option 2). Total estimated costs to facilities defined as CAFOs with between 300 and 1,000 AU range from $19 million (Option 1) to $39 million annually (Option 2). EPA estimates that of the total cost to additional operations that may be designated as CAFOs ranges from about $3 million to $4 million annually, depending on the regulatory option. More information on these costs is provided in Section 3, along with cost information on alternative regulatory options EPA considered.

Table ES-2. Annual Pre-tax Cost of the Rule, $2001 (Option 1 & Option 2)

Sector	Number of Operations		Aggregate Incremental Costs			
	CAFOs >1,000 AU	CAFOs 300-1,000 AU	Total	CAFOs >1,000 AU	CAFOs 300-1,000 AU	Designated CAFOs
	(number)		($2001, millions, pre-tax)			
ELG Option 1						
Fed Cattle	1,766	174	$19.2	$17.8	$1.1	$0.3
Veal	12	230	<$0.1	<$0.1	<$0.1	$0.0
Heifer	242	7	$3.5	$1.3	$2.1	$0.1
Dairy	1,450	1,949	$71.5	$59.7	$11.3	$0.5
Hogs	3,924	1,485	$8.6	$6.4	$2.1	$0.1
Broilers	1,632	520	$18.5	$15.3	$2.1	$1.1
Layers - Dry	729	26	$6.6	$6.3	$0.1	$0.2
Layers - Wet	383	24	$6.4	$6.4	$0.0	<$0.1
Turkeys	388	37	$6.3	$5.9	$0.2	$0.2
Total	**10,526**	**4,452**	**$140.6**	**$119.1**	**$19.0**	**$2.5**
ELG Option 2						
Fed Cattle	1,766	174	$88.2	$85.8	$1.9	$0.5
Veal	12	230	$0.0	<$0.1	<$0.1	$0.0
Heifer	242	7	$6.3	$3.8	$2.4	$0.1
Dairy	1,450	1,949	$151.1	$128.2	$22.0	$0.9
Hogs	3,924	1,485	$34.8	$24.9	$9.5	$0.4
Broilers	1,632	520	$20.5	$16.8	$2.4	$1.3
Layers - Dry	729	26	$7.5	$7.2	$0.1	$0.2
Layers - Wet	383	24	$8.9	$8.4	$0.5	<$0.1
Turkeys	388	37	$8.7	$8.1	$0.3	$0.3
Total	**10,526**	**4,452**	**$326.0**	**$283.2**	**$39.1**	**$3.8**

May not add due to rounding. Number of operations do not include designated facilities. See notes Table 3-1.
"Layers: dry" are operations with dry manure systems. "Layers: wet" are operations with liquid manure systems.

These aggregated cost estimates reflect pre-tax costs. However, EPA's model calculates both pre-tax and post-tax costs (see Section 2.2.4). The post-tax costs reflect the fact that a CAFO would be able to depreciate or expense these costs, thereby generating a tax savings. Post-tax costs thus are the actual costs the CAFO would face. Pre-tax costs reflect the estimated total social cost of the regulations, including lost tax revenue to governments. Pre-tax dollars are used when comparing estimated costs to monetized benefits that are estimated to accrue under the final regulations (see Section 5). All costs presented in this section are presented in terms of pre-tax 1997 dollars and do not account for annual tax savings to CAFOs. However, post-tax costs are also used to evaluate impacts on regulated facilities using a discounted cash flow analysis, as presented in Section 3.3. EPA's estimated compliance costs presented in the *Development Document* are also estimated in 1997 dollars because 1997 is the base year of the analysis (USEPA, 2002). Estimated costs have been converted from 1997 dollars to 2001 dollars using the Construction Cost Index (ENR, 2002).

ES.4.2 Costs to the NPDES Permitting Authority

The NPDES permitting authority would incur additional costs to alter existing State programs and obtain EPA approval to develop new permits, review new permit applications, and issue revised permits that meet the final regulatory requirements. EPA expects that NPDES permitting authorities will incur administrative costs related to the development, issuance, and tracking of general or individual permits.

State and Federal administrative costs to issue a general permit include costs for permit development, public notice and response to comments, and public hearings. States and EPA might also incur costs each time a facility operator applies for coverage under a general permit due to the expenses associated with a NOI. These per-facility administrative costs include initial facility inspections and annual record-keeping expenses associated with tracking NOIs. Administrative costs for an individual permit include application review by a permit writer, public notice, and response to comments. An initial facility inspection might also be necessary.

EPA assumes that under the final regulations more than 15,500 CAFOs would be permitted. This estimate consists of about 15,000 CAFOs covered by State permits and about 500 CAFOs covered by Federal permits. Administrative costs incurred by State permitting authorities are expected to be $8.5 million. EPA permitting authorities will incur the remaining $0.3 million. EPA has expressed these costs in 2001 dollars, annualized over the 5-year permit term using a 7 percent discount rate. A summary of this analysis is available in section 10 of the preamble to the final rule. More information is is available in Section 5 of this report. See also the *NPDES Support Document* (USEPA, 2002n) and in the *Development Document* (USEPA, 2002).

ES.5 FINANCIAL EFFECTS

ES.5.1 Existing CAFOs

Table ES-3 presents the results of EPA's analysis of the estimated CAFO financial effects in terms of the number of operations that will experience affordable, moderate, or stress impact because of this rule. Results are shown by sector for CAFOs with more than 1,000 AU only. The analysis evaluates the regulatory impacts on existing CAFOs with more than 1,000 AU only because this size of operation

only would be subject to the ELG regulations (and, therefore, EPA has determined whether the final ELG requirements reflect Best Available Technologies Economically Achievable or BATEA. Operations with fewer than 1,000 AU would be subject to "Best Professional Judgement" [BPJ]).

EPA's analysis results are shown in Table ES-3. For Option 1, the analysis indicates that, among all CAFOs with more than 1,000 AU in the veal, heifer, dairy, hog, turkey, and egg-laying sectors, the impacts due to this rule can be characterized as "Affordable" or "Moderate." Therefore, EPA considers this option to be economically achievable for existing facilities in these animal sectors. EPA estimates that a total of 15 existing CAFOs (less than 1percent of all CAFOs with more than 1,000 AU) would experience financial stress and might be vulnerable to closure. By sector, EPA estimates that 12 beef operations (1 percent of affected beef CAFOs) and 3 broiler operations (less than 1 percent of affected broiler CAFOs) might close as a result of complying with the final regulations.

For Option 2, the analysis indicates that, among all CAFOs with more than 1,000 AU in the veal, dairy, turkey, and egg-laying sectors, the impacts due to this rule can be characterized as "Affordable" or "Moderate." Therefore, EPA considers this option to be economically achievable for existing facilities in these animal sectors. (Moderate impacts might be incurred by operations in some sectors, but these impacts are not considered to result in facility closure.) In the beef cattle, heifer, hog, and broiler sectors, however, EPA's analysis indicates that the final rule would cause some existing CAFOs to experience financial stress, making these operations vulnerable to facility closure. Across all sectors, EPA estimates that 285 existing CAFOs (about 3 percent of all all CAFOs with more than 1,000 AU) would experience financial stress and might be vulnerable to closure. By sector, EPA estimates that 49 beef operations (3 percent of affected beef CAFOs), 22 heifer operations (9 percent), 204 hog operations (5 percent of affected hog CAFOs), and 10 broiler operations (1 percent) might close as a result of complying with the final regulations. See Section 3 of this report for more information.

These estimates of the number of potential CAFO closures are cumulative and reflect the results of both the farm level analysis and the enterprise level analysis. These estimated closure rates are generally consistent with the findings of economic achievability of previous effluent guidelines for other industrial point source categories. Based on the results of this analysis, EPA concludes that both Option 1 and Option 2 would be considered economically achievable for existing CAFOs.

These results are based on an analysis that does not consider the longer term effects on market adjustment and also available cost-share assistance from Federal and State farm conservation programs. EPA believes that such adjustments could lessen the economic impacts of the final regulations over time. Sections 3.3.5 show the results of this analysis under assumptions of long-run market adjustment and cost-share assistance.

These results reflect estimated costs for two technology options where EPA has estimated the cost of land application based on nitrogen-based application rates only (Option 1) and also the cost of land application based on nitrogen-based application rates, except in those instances where EPA believes that phosphorus-based rates are likely to be appropriate (Option 2). Given that the final rule provides for appropriate flexibilities in the use of phosphorus-based rates, such as multi-year phosphorus application, EPA has not accounted for the potential costs savings resulting from these flexibilities in its analysis. As a result, the economic impacts presented here may be overestimated. Also, for the purpose of this analysis, EPA assumes that small business CAFOs with between 300 and 1,000 AU would incur costs similar to those estimated for CAFOs with more than 1,000 AU (although these smaller-sized operations will be subject to BPJ and not the ELG requirements under the revised NPDES requirements). These upper end cost estimates could, therefore, overstate the financial effects for this size category.

Table ES-3. Financial Effects of the ELG on CAFOs (>1,000 AU), Option 1 and Option 2

Sector	Number CAFOs (>1,000AU)	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		(Number)			(Percent of Total Operations)		
ELG Option 1							
Fed Cattle	1,766	1,754	0	12	99%	0%	1%
Veal	12	12	0	0	100%	0%	0%
Heifer	242	242	0	0	100%	0%	0%
Dairy	1,450	1,232	218	0	85%	15%	0%
Hogs	3,924	3,924	0	0	100%	0%	0%
Broilers	1,632	1,334	294	3	82%	18%	0%
Layers - Dry	729	729	0	0	100%	0%	0%
Layers - Wet	383	383	0	0	100%	0%	0%
Turkeys	388	388	0	0	100%	0%	0%
Total	**10,526**	**9,998**	**512**	**15**	**95%**	**5%**	**0%**
ELG Option 2							
Fed Cattle	1,766	1,717	0	49	97%	0%	3%
Veal	12	12	0	0	100%	0%	0%
Heifer	242	220	0	22	91%	0%	9%
Dairy	1,450	1,019	431	0	70%	30%	0%
Hogs	3,924	3,249	470	204	83%	12%	5%
Broilers	1,632	1,032	590	10	63%	36%	1%
Layers - Dry	729	729	0	0	100%	0%	0%
Layers - Wet	383	383	0	0	100%	0%	0%
Turkeys	388	388	0	0	100%	0%	0%
Total	**10,526**	**8,749**	**1,491**	**285**	**83%**	**14%**	**3%**

Source: USEPA. May not add due to rounding.
"Layers: dry" are operations with dry manure systems. "Layers: wet" are operations with liquid manure systems.

Section 3 of this report also presents the results of alternative regulatory options considered in the 2001 Proposal. Also presented are potential closures assuming that operations with fewer than 1,000 AU might have been subject to the ELG, as was proposed by EPA.

ES.5.2 Small Business CAFOs

Table ES-4 shows EPA's estimate of the number of small businesses that would be affected by the final regulations. EPA's analysis indicates that the final rule could cause financial stress to some small businesses, making these businesses vulnerable to closure (assuming no cost passthrough and cost-share assistance). Section 4 of this report provides more detailed information.

The Small business Administration (SBA) defines a "small business" in the livestock and poultry sectors in terms of average annual receipts (or gross revenue). SBA size standards for these industries define a "small business" as one with average annual revenues over a 3-year period of less than $0.75 million for dairy, hog, broiler, and turkey operations; $1.5 million for beef feedlots; and $9.0 million for egg operations. EPA defines a "small" egg laying operation for purposes of its regulatory flexibility assessments as an operation that generates less than $1.5 million in annual revenue. EPA consulted with SBA on the use of this alternative definition. A summary of EPA's rationale and supporting analyses pertaining to this alternative definition is provided in the record and in Section 4.

Given these considerations, EPA defines a "small business" for this rule as an operation that houses or confines less than 1,400 fed beef cattle (includes fed beef, veal, and heifers); 300 mature dairy cattle; 2,100 market hogs; 37,500 turkeys; 61,000 layers; or 375,000 broilers. The approach used to derive these estimates is described in Section 4 and in the record.

EPA estimates that of the approximately 238,000 animal confinement facilities in 1997, roughly 95 percent are small businesses. Not all of these operations would be affected by the final rule. Table ES-4 shows EPA's estimates of the number of small business CAFOs that would be affected by this rule. For this analysis, EPA estimates that about 6,200 affected CAFOs across all size categories are small businesses, accounting for more than 40 percent of the estimated 14,515 affected facilities. EPA estimates that among CAFOs with more than 1,000 AU about 2,330 operations are small businesses (accounting for about one-fourth of all CAFOs in this size category). Most affected small businesses are in the broiler sector. Among CAFOs with between 300 and 1,000 AU, EPA estimates about 3,830 operations are small businesses (accounting for the majority of operations in this size category), and most of the affected small businesses are in the hog, dairy, and broiler sectors.[2]

For the 2001 proposal, EPA conducted a preliminary assessment of the potential impacts on small business CAFOs based on the results of a costs-to-sales test (66 FR 3101). This screen test indicated the need for additional analysis to characterize the nature and extent of impacts on small entities. Based on the results of this initial assessment, EPA projected that it would likely not certify that the proposal, if promulgated, would not impose a significant economic impact on a substantial number of entities. Therefore, EPA convened a SBAR Panel and prepared an Initial Regulatory Flexibility Analysis (IRFA) pursuant to §§609(b) and 603 of the RFA, respectively. The 2001 proposal provides more

[2] For reasons noted in the record, EPA believes that the number of small broiler operations is overestimated and might actually include a number of medium and large broiler operations that should not be considered small businesses.

information on EPA's small business outreach and the Panel activities during the development of this rulemaking (66 FR 3121). Section 10 of the preamble to the final rule summaries EPA's Final Regulatory Flexibility Analysis (FRFA), as required under §604 of the RFA. This analysis is provided in Section 4.

In examining the effects on small businesses for the final rule, EPA followed the same approach used to evaluate the impacts on existing CAFOs, as described in Section ES.2. For the purposes of this analysis, EPA assumes that small business CAFOs with between 300 and 1,000 AU would incur costs similar to those estimated for CAFOs with more than 1,000 AU (although these smaller-sized operations will be subject to BPJ and not the ELG requirements under the revised NPDES requirements). These upper end cost estimates could, therefore, overstate the financial effects for small businesses in this size category. For past regulations, EPA has often analyzed the potential impacts to small businesses by evaluating the results of a costs-to-sales test, measuring the number of operations that will incur compliance costs at varying threshold levels (including ratios where costs are less than 1 percent, between 1 and 3 percent, and greater than 3 percent of gross income). EPA conducted such an analysis at the time of the 2001 proposal, indicating that about 80 percent of the estimated number of small businesses directly subject to the rule as CAFOs might incur costs in excess of three percent of sales. EPA believes that its more refined analysis used for its general analysis (presented here) better reflects the potential impacts to regulated small businesses.

Using the approach used to evaluate the impacts on existing CAFOs, EPA's analysis indicates that the final rule could cause financial stress to some small businesses, making these businesses vulnerable to closure. These results are presented in Table ES-4.

For Option 1, the analysis indicates that, among all small business CAFOs in the veal, dairy, hog, turkey, and egg-laying sectors, the impacts due to this rule can be characterized as "Affordable" or "Moderate." EPA estimates that a total of 172 small businesses (3 percent of all small business CAFOs with more than 300 AU) would experience financial stress and might be vulnerable to closure. By sector, these closures are comprised of about 131 small businesses in the beef sector, 38 businesses in the heifer sector, and 3 businesses in the broiler sector. Most of these (nearly 90 percent) are operations with fewer than 1,000 AU. For Option 2, the analysis indicates that, among all small business CAFOs in the veal, dairy, hog, turkey, and egg-laying sectors, the impacts due to this rule can be characterized as "Affordable" or "Moderate." EPA estimates that a total of 262 small businesses (4 percent of all small business CAFOs with more than 300 AU) would experience financial stress and might be vulnerable to closure. By sector, these closures are comprised of about 183 small businesses in the beef sector, 50 businesses in the heifer sector, and 19 businesses in the broiler sector. Nearly 90 percent of these potential closures are operations with fewer than 1,000 AU. See Section 4 of this report for more information.

These estimates of the number of potential CAFO closures are cumulative and reflect the results of both the farm level analysis and the enterprise level analysis. These results are based on an analysis that does not consider the longer term effects on market adjustment and also available cost-share assistance from Federal and State farm conservation programs. EPA believes that such adjustments could lessen the economic impacts of the final regulations over time.

Table ES-4. Results of EPA's Small Business Analysis, Option 1 and Option 2

Sector	Number of Small Business CAFOs	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		(Number)			(Percent of Total Operations)		
Option 1							
Fed Cattle	712	581	0	131	82%	0%	18%
Veal	12	12	0	0	100%	0%	0%
Heifer	327	289	0	38	88%	0%	12%
Dairy	1330	1330	0	0	100%	0%	0%
Hogs	1485	1485	0	0	100%	0%	0%
Broilers	1823	1395	424	3	77%	23%	0%
Layers: Dry	24	24	0	0	100%	0%	0%
Layers: Wet	407	407	0	0	100%	0%	0%
Turkeys	31	31	0	0	100%	0%	0%
Total	**6151**	**5554**	**424**	**172**	**90%**	**7%**	**3%**
Option 2							
Fed Cattle	712	529	0	183	74%	0%	26%
Veal	12	12	0	0	100%	0%	0%
Heifer	327	277	0	50	85%	0%	15%
Dairy	1330	1306	24	0	98%	2%	0%
Hogs	1485	1483	2	0	100%	0%	0%
Broilers	1823	1026	780	19	56%	43%	1%
Layers: Dry	24	24	0	0	100%	0%	0%
Layers: Wet	407	407	0	0	100%	0%	0%
Turkeys	31	31	0	0	100%	0%	0%
Total	**6151**	**5129**	**806**	**262**	**83%**	**13%**	**4%**

Source: USEPA. See Economic Analysis. May not add due to rounding. Does not includes the number of CAFOs includes designated facilities. Assumes that the costs that will be incurred by those sized operations to comply with BPJ-based limitations under the revised NPDES regulations are similar to the estimated costs that would be incurred if Medium CAFOs had to comply with the ELG.
"Layers: dry" are operations with dry manure systems. "Layers: wet" are operations with liquid manure systems.

ES.5.3 New CAFOs

EPA evaluated impacts on new source CAFOs by comparing the costs borne by new source CAFOs to those estimated for existing sources. That is, if the expected cost to new sources is similar to or less than the expected cost borne by existing sources (and that cost was considered economically achievable for existing sources), EPA considers that the regulations for new sources do not impose requirements that might grant existing operators a cost advantage over new CAFO operators and further determines that the NSPS requirements are affordable and do not present a barrier to entry for new facilities. In general, costs to new sources from NSPS requirements are lower than the costs for retrofitting the same technologies at existing sources since new sources are able to apply control technologies more efficiently than existing sources that might incur high retrofit cost. New sources will be able to avoid the retrofit costs that will be incurred by existing sources. Furthermore, new sources might be able to avoid the other various control costs facing some existing producers through careful site selection. The requirements promulgated in today's rule do not give existing operators a cost advantage over new CAFO operators; therefore, the NSPS do not present a barrier to entry for new facilities. Examples of avoided retrofit costs and costs of total containment systems and waste management, including land application, for both existing and new sources, are provided in Section 4 of the preamble to the final regulations. More detailed information is provided in the *Development Document* (USEPA, 2002) and related cost reports, as well as in Section 3.

ES.5.4 National Markets

EPA's market analysis evaluates the effects of the final regulations on commodity prices and quantities at the national level. The analysis also presents EPA's estimate of national and regional employment changes, net trade, and changes in economic output, among other supplemental analyses. Section 3 of this report provides more detailed information.

EPA expects that predicted changes in animal production might raise producer prices as the market adjusts to the final regulatory requirements. For most sectors, EPA estimates that producer price changes will rise by less than one percent compared to the pre-regulation baseline price. At the retail level, EPA estimates that poultry and red meat prices will rise about one cent per pound. EPA also estimates that egg prices will rise by about one cent per dozen and that milk prices will rise by about one cent per gallon. Trade and employment effects are also expected to be modest.

EPA also considered whether the final rule could have community level and/or regional impacts if it substantially altered the competitive position of livestock and poultry production across the nation, or led to growth or reduction in farm production (in- or out-migration) in different regions and communities. Ongoing structural and technological changes in these industries have influenced where farmers operate and have contributed to locational shifts between the traditional production regions and the emergent, nontraditional regions. Production is growing rapidly in the emergent regions because of competitive pressures and because specialized producers tend to have the advantage of lower per-unit costs of production. This is especially true in hog and dairy production.

To evaluate the potential for differential impacts among farm production regions, EPA examined employment impacts by region. EPA also evaluated whether the final requirements could result in substantial changes in volume of production, given predicted facility closures, within a particular production region. EPA concludes from these analyses that regional and community level effects are

estimated to be modest, but do tend to be concentrated within the more traditional agricultural regions. This analysis is discussed in Section 3.

EPA does not expect that this rule will have a significant impact on where animals are raised. On one hand, on-site improvements in waste management and disposal, as required by the final rule, could accelerate recent shifts in production to more nontraditional regions as higher-cost producers in some regions exit the market to avoid the relatively high retrofitting costs associated with bringing existing facilities into compliance. On the other hand, the final regulations might favor more traditional production systems where operators grow both livestock and crops, since these operations tend to have available cropland for land application of manure nutrients. These types of operations tend to be more diverse and less specialized and, generally, smaller in size. Long-standing farm services and input supply industries in these areas could likewise benefit from the final rule, given the need to support on-site improvements in manure management and disposal. Local and regional governments, as well as other nonagricultural enterprises, would also benefit.

ES.6 COST-BENEFIT ANALYSIS

As Table ES-5 shows, the economic value of the environmental benefits EPA is able to monetize (i.e., evaluate in dollar terms) is comparable to the estimated costs of the rule. EPA has estimated the monetized benefits of the final rule for all operations with more than 1,000 AU. For Option 1, total monetized benefits for CAFOs with more than 1,000 AU range from $141 million to $224 million. For Option 2, total monetized benefits for CAFOs with more than 1,000 AU range from $204 million to $340 million annually. These benefit estimates are expressed as pre-tax, 2001 dollars and have been calculated assuming a 7 percent discount rate. Monetized benefit categories are primarily in the areas of improved surface water quality (measured in terms of enhanced recreational value), reduced nitrates in private wells, reduced shellfish bed closures from pathogen contamination, and reduced fish kills from episodic events. EPA also identified a number of benefits categories that could not be monetized, including reduced euthrophication of estuaries, reduced pathogen contamination in private wells, reduced health and environmental risks associated with episodic pollutant discharge events, drinking water treatment cost savings, reduced odor and air emissions, and avoided loss in property value near CAFOs, among other benefits. These benefits are described in more detail the *Benefits Analysis* and other supporting documentation provided in the record.

These estimated benefits compare to EPA's estimate of the total social costs covering both industry and permit authority costs for operations with more than 1,000 AU only. These costs range from $125 million (Option 1) to $289 million (Option 2) annually for all CAFOs with more than 1,000 AU, as was estimated in the Agency's *Benefit Analysis*. These costs include compliance costs to all CAFOs, as well as administrative costs to Federal and State governments. EPA estimates of the administrative cost to Federal and State governments to implement this rule is $9 million per year. There may be additional social costs that have not been monetized. However, these costs are estimated based on the cost of land application based on nitrogen-based application rates, except in those instances where EPA believes that phosphorus-based rates are likely to be appropriate. As discussed previously, the final rule includes provisions for appropriate flexibilities in the use of phosphorus-based rates, such as multi-year phosphorus application, but the potential costs savings resulting from these flexibilities are not reflected in the analysis. Therefore, the costs of this rule may have been overestimated.

Table ES-5 Total Annual Monetized Social Costs and Benefits (millions $2001), CAFO >1,000 AU

Category	Option 1	Option 2
Total Monetized Social Costs		
Industry Compliance Costs (pre-tax):	$119	$283
State/Federal Administrative Costs:	$6	$6
Total Social Costs	*$125*	*$289*
Total Monetized Benefits		
Improved Surface Water Quality	$102.4 - $182.6	$166.2 - $298.6
Reduced Incidence of Fish Kills	$0.0 - $0.1	$0.1
Improved Commercial Shell Fishing	$0.1 - $2.0	$0.3 - $3.4
Reduced Contamination of Private Wells	$33.3	$30.9
Reduced Contamination of Animal Water Supplies	$4.7	$5.3
Reduced Eutrophication of Estuaries	$0.1	$0.2
Reduced Water Treatment Costs	$0.7 - $1.0	$1.1 - $1.7
Reduced eutrophication & pathogen contamination of coastal & estuarine waters	not monetized	not monetized
Reduced pathogen contamination of private & public underground sources of drinking water	not monetized	not monetized
Reduced human & ecological risks from antibiotics, hormones, metals, salts	not monetized	not monetized
Improved soil properties	not monetized	not monetized
Reduced cost of commercial fertilizers for non-CAFO operations	not monetized	not monetized
Total Benefits	**$141.3 + [B] - $223.8 + [B]**	**$204.1 + [B] - $340.2 +[B]**

Source: USEPA. May not add due to rounding. [B] represents the non-monetized benefits of the rule.

These cost and benefit estimates are also expressed as pre-tax, 2001 dollars and have been calculated assuming a 7 percent discount rate. See Section 5 for more information.

ES.7 OTHER INFORMATION

This report presents a summary of estimated per-animal and per-facility costs by animal sector (Section 3 and Appendices B and D). It also presents an overview of the cost annualization approach

(Appendix A), details on the model used to estimate changes in producer prices associated with the final regulations (Appendix C), and the results of a cost-effectiveness analysis (Appendix E).

Section 2 of the Proposal EA (USEPA, 2001a) provides a detailed industry profile of the affected regulated livestock and poultry sectors and meat and poultry processors. The Proposal EA also details the model used to estimate economic impacts on CAFOs and national level markets (Section 4 and Appendix B). Appendix D of the Proposal EA also shows the results of sensitivity analyses EPA conducted for the 2001 Proposal.

This report does not include a detailed presentation of the economic benefits that are expected to accrue as a result of the final CAFO regulations. That analysis is provided in the *Benefits Analysis* (USEPA, 2002k) that supports this rulemaking. The *Development Document* (USEPA, 2002) provides more detailed information on the farm level costs that EPA estimates for this analysis.

ES.8 ORGANIZATION OF THE REPORT

This report is organized to allow those interested in the impacts on a specific industry sector to find information easily. The sections of the report are as follows:

- Section 1 provides a summary of the existing, proposed, and final regulations affecting CAFOs.
- Section 2 describes the data and methodologies EPA uses to estimate the total annual incremental costs and the economic impacts that would be incurred by the livestock and poultry industry as a result of the final CAFO regulations, highlighting changes EPA has made since the 2001 Proposal in response to public comments.
- Section 3 presents a summary of the estimated national, annual costs and the economic impacts on regulated facilities of the final CAFO regulations.
- Section 4 presents the results of EPA's Final Regulatory Flexibility Analysis and describes the possible financial effects on small businesses.
- Section 5 presents a discussion of the regulatory costs and benefits pursuant to Executive Order 12866 and the Unfunded Mandates Reform Act (UMRA).
- Section 6 presents the references used throughout the report and its appendices.
- Appendix A presents a description of EPA's method to annualize costs and more detailed information on the annualized costs used as inputs to EPA's CAFO level economic analysis.
- Appendix B shows EPA's annualized compliance cost estimates for the ELG technology option chosen for the final regulations.
- Appendix C describes EPA's methodology for estimating changes in farm revenue based on predicted changes in market prices and quantities attributable to the final regulations.

- Appendix D shows EPA estimates of financial effects on operations with more than 300 AU for the ELG technology option chosen for the final regulations.

- Appendix E presents EPA's analysis of the cost-effectiveness of the final CAFO regulation, in terms of pollutant removal effectiveness for nutrients and other priority pollutants, and background information on the methods EPA used for the C-E analysis.

SECTION ONE

REQUIREMENTS OF THE FINAL CAFO REGULATIONS

The U.S. Environmental Protection Agency (EPA) is revising and updating the two primary regulations that ensure that manure, wastewater, and other process waters generated by concentrated animal feeding operations (CAFOs) do not impair water quality. EPA's final regulatory changes affect the existing National Pollutant Discharge Elimination System (NPDES) provisions and the existing effluent limitations guidelines (ELG) for "feedlots." The NPDES provisions define and establish permit requirements for CAFOs, and the ELG establish the technology-based effluent discharge standard that is applied to CAFOs. Existing regulations were originally promulgated in the 1970s. EPA is revising the regulations to address changes that have occurred in the animal industry sectors over the past 25 years, to clarify and improve implementation of CAFO requirements, and to improve the environmental protection achieved under these regulations. Final revisions to the NPDES and ELG regulations are referred to in this report as the final CAFO regulations.

On January 12, 2001, EPA published a proposal to revise and update these regulations (66 FR 2959), referred to in this report as the "2001 Proposal." The Economic Analysis that supports the 2001 Proposal contains information on EPA's estimates of the cost, financial effects, and monetized benefits of the proposed revisions. That analysis, titled *Economic Analysis of the Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations*, is referred to in this report as the "Proposal EA" (USEPA, 2001a). EPA also published two Notices of Data Availability in the Federal Register (66 FR 58556 and 67 FR 48099). These Notices present new data and information EPA has received since the 2001 Proposal, soliciting further public review and comment.

This Economic Analysis (EA) summarizes EPA's analysis of the estimated annual compliance costs and the economic impacts that might be incurred by affected operations that are subject to the final revisions. Additional information on the regulatory alternatives that EPA considered for the 2001 Proposal is presented in the EA supporting the proposed regulations (USEPA, 2001a). The report covers financial impacts on CAFOs, potential impacts on processors of livestock and poultry products, and market and other secondary impacts such as impacts on prices, quantities, trade, employment, and output. It also responds to requirements for small business analyses under the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA), and for cost-benefit analyses under Executive Order 12866 and the Unfunded Mandates Reform Act (UMRA).

EPA also provides additional material on the final CAFO regulations in the *Development Document for the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations*, which discusses how EPA estimated compliance costs of the final regulations. EPA's detailed benefit analysis, titled *Environmental and Economic Benefit Analysis of the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations*, provides information about existing water quality impairments associated with animal production operations and estimates the extent to which these impairments might be mitigated by the final CAFO regulations.

This section begins with a discussion of the current regulatory framework. In the course of this discussion, the section also defines and describes animal feeding operations (AFOs) and CAFOs (Section 1.1). The reasons why EPA is revising these regulations are also discussed. Section 1.2 discusses EPA's proposed revisions to existing CAFO requirements in the 2001 Proposal (66 FR 2959). Section 1.3 reviews the final revisions promulgated by EPA.

1.1 SUMMARY OF EXISTING REGULATORY FRAMEWORK

In 1972 Congress passed the Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." 33 U.S.C. [United States Code] § 1251(a). The CWA establishes a comprehensive program for protecting the nation's waters. Among its core provisions, the CWA prohibits the discharge of pollutants from a point source to waters of the United States except those authorized by an NPDES permit. The CWA also provides for the development of technology-based effluent limitations that are imposed through NPDES permits to control direct discharges of pollutants.

In response to the CWA, EPA established several regulatory programs, of which two pertain to livestock and poultry operations that confine animals (commonly referred to by EPA as animal feeding operations, or AFOs). These regulations include the requirements for discharge permits for CAFOs under the NPDES program (40 CFR Part 122.23) (see Section 1.1.1) and the ELG for animal feeding operations, of "feedlots" (40 CFR Part 412) (see Section 1.1.2).

1.1.1 NPDES Permit Regulation of CAFOs

The NPDES permit program controls pollution from identifiable discharge points or sources (e.g., discharge pipes or ditches). Under the NPDES permit program, all point sources that directly discharge pollutants to waters of the United States must apply for an NPDES permit and may discharge pollutants only under the terms of that permit. Such permits must include nationally established effluent discharge limitations. In the absence of national effluent limitations, NPDES permit writers must establish limitations and standards on a case-by-case basis, based on their "best professional judgment (BPJ)." Effluent limitations guidelines and BPJ provide the basis for technology-based effluent limits in NPDES permits.

Under the CWA, CAFOs are defined as point sources of pollution and are thus subject to NPDES permitting requirements (33 U.S.C. § 1362). The existing NPDES provisions that define which operations are CAFOs and establish permit requirements for CAFOs (40 CFR Part 122.23) were promulgated on March 18, 1976 (41 FR 11458).

Before an operation may be defined as a CAFO, it must first meet the definition of an AFO. AFOs are agricultural enterprises where animals are kept and raised in confined situations for a specified time during the year and where animals, feed, manure, dead animals, and production operations are congregated on a small land area. As defined by federal regulation, AFOs are lots or facilities where animals

> ....have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12 month period and crops, vegetation forage growth, or post-harvest

residues are not sustained in the normal growing period over any portion of the lot or facility. (40 CFR 122.23(b)(1)).

In 1976 EPA issued regulations defining which AFOs met the definition of a CAFO under the NPDES permit program. CAFOs are AFOs that confine a specified number of animals and in some cases meet specific discharge criteria. The specified number of animals is determined using the concept of an "animal unit" (AU). The term "animal unit" refers to a metric established in the 1970 regulations in an attempt to equate the characteristics of the wastes produced by different animal types. For each animal type, EPA's regulations identify the number of animals that is equivalent to 1 AU.

As defined in the existing regulation (40 CFR Part 122), 1 AU is equivalent to any of the following:

- 1 slaughter or feeder beef cattle.
- 0.7 mature dairy cows.
- 2.5 swine weighing more than 55 pounds.
- 55 turkeys.
- 100 laying hens or broilers (facility with continuous-flow watering system); 30 hens or broilers (facility with liquid manure handling system).
- 0.5 horses.
- 10 sheep or lambs.
- 5 ducks.

For the purpose of this analysis, the 1,000-AU threshold that EPA assumes for broiler and egg laying operations with dry manure systems (not covered under the existing regulations) is 125,000 meat chickens or broilers and 82,000 egg laying chickens. For veal and heifer operations, also not currently covered under the existing regulations, EPA assumes a 1,000-AU threshold consistent with that for cattle feeding operations (i.e., 1,000 AU equals 1,000 head).[1] EPA also assumes a 1,000-AU threshold for stand-alone nursery pig operations of 5,000 nursery pigs.

The existing NPDES regulation defines AFOs with 1,000 AU or more as CAFOs. These facilities are not CAFOs if they discharge only in the event of a 25-year, 24-hour storm. The existing regulation also states that AFOs with between 300 and 1000 AU are CAFOs if they meet certain conditions. These conditions include the discharge of pollutants into waters through a ditch, flushing system, or other man-made device. An AFO with between 300 and 1000 AU may also be defined as a CAFO if pollutants are discharged to waters that originate outside of and pass over, across, or through the facility or come into contact with confined animals. The state agency or other authority that issues NPDES permits may also designate AFOs with fewer than 1,000 AU as CAFOs if they are considered to have discharges that could

[1] The final rule preamble refers to operations in this size category as "Large" CAFOs.

significantly impair surface water. (Operations with between 300 AU and 1,000 AU are referred to in the final rule preamble as "Medium" CAFOs; operations with fewer than 300 AU are referred to as "Small" CAFOs.)

All NPDES permits for CAFOs with more than 1,000 AU must include requirements equivalent to or more stringent than the established ELG. As noted above, certain smaller operations can also be defined or designated as CAFOs, but the ELG does not apply to these CAFOs. In these cases, the permit writer must develop technology-based limitations based on BPJ for inclusion in the NPDES permit.

1.1.2 Effluent Limitations Guidelines for Feedlots

The CWA authorizes EPA to establish restrictions on the types and amounts of pollutants discharged from various industrial, commercial, and public sources of wastewater. Effluent guidelines define the types and amount of pollutants an NPDES permitted facility is allowed to discharge. Direct dischargers must comply with ELG and new source performance standards (NSPS). These limitations and standards are established by regulation for categories of industrial dischargers, and they are based on the degree of control that can be achieved using various levels of pollution control technology. These guidelines base the discharge (or effluent) amount on the best available technology that is economically achievable. Under the Clean Water Act, EPA has an obligation to promulgate effluent guidelines that achieve "best available technology economically achievable" (BATEA).

The existing national ELGs for the feedlots category, including the beef, dairy, swine, and poultry subcategories (40 CFR Part 412), were established on February 14, 1974 (39 FR 5704). The feedlot ELG allow for no discharge of process wastewater pollutants into the Nation's waters except when chronic or catastrophic storm events cause an overflow from a facility designed, constructed, and operated to hold process-generated wastewater plus runoff from a 25-year, 24-hour storm event. As a result, the current effluent guidelines for feedlots are usually referred to as "zero discharge" requirements. Many feedlots meet the "zero discharge" requirement by containing wet manure in lagoons and by land applying manure. The current ELG are applicable to NPDES permits issued to CAFOs with more than 1,000 AU. Discharge limits for facilities with fewer than 1,000 AU are established using BPJ.

1.1.3 Industries Affected by the Final CAFO Regulations

In this EA, information is organized by sector rather than by subcategory. This report focuses on the major livestock and poultry industries affected by the ELG and the NPDES program requirements. By North American Industry Classification System (NAICS)[2] code, these include:

- Cattle feedlots, NAICS 112112 [includes veal] (SIC 0211, beef cattle feedlots).
- Beef cattle ranching and farming, NAICS 112111 (SIC 0241, dairy heifer replacement farms).

[2] NAICS recently replaced the SIC (Standard Industrial Classification) system.

- Dairy cattle and milk production, NAICS 11212 (SIC 0241, dairy farms).
- Hog and pig farming, NAICS 11221 (SIC 0213, hogs).
- Broilers and other meat-type chickens, NAICS 11232 (SIC 0251, broiler, fryer, and roaster chickens).
- Turkey production, NAICS 11233 (SIC 0253, turkey and turkey eggs).
- Chicken egg production, NAICS 11231 (SIC 0252, chicken eggs).

In some cases, information is limited to analyze some sectors individually. For example, the analysis often aggregates information for the "cattle" sector presenting an aggregated review on fed cattle, heifer, and veal operations because sector-specific financial data and other industry information is limited. Under the regulations, however, beef cattle and heifer operations are covered under the same subcategory but veal operations are covered under a separate subcategory. Information on the types of operations in the poultry sector (broiler, egg layer, and turkey operations) is also presented together, in some cases depending on best available data. The dairy and swine subcategories are evaluated separately.

The ELG and NPDES permit requirements also affect other types of animal confinement operations, including operations that raise sheep, lambs, goats, horses, and other miscellaneous animal species. For some of these sectors (horses, ducks, etc.), EPA is updating the NPDES permit requirements as part of this rulemaking. Because EPA is not revising the ELG for these other sectors, however, these sectors are not covered in this analysis because EPA is not required to perform an economic achievability analysis for NPDES requirements (economic achievability analysis is only required for effluent guideline requirements). Also, EPA's cost and benefit analysis is focused only on those livestock and poultry operations that account for a majority of both number of animals produced and manure nutrients generated (cattle, dairy, hog and poultry sectors). EPA's national level analysis does not specifically account for other types of operations covered under the NPDES regulation since relatively few such operations exist. (See also response to comment DCN CAFONODA-600059-4.)

The U.S. Department of Agriculture (USDA) reports that there were 1.1 million livestock and poultry operations in the United States in 1997, corresponding to these affected industry sectors (USDA/NASS, 1999a). This number includes both confinement and non-confinement (grazing and rangefed) production, as well as both commercial and noncommercial operations. Of these operations, USDA estimates that there are about 240,000 operations raise animals in confinement (Kellogg, 2002). Table 1-1 summarizes the estimated total number of AFOs of all sizes in each of the four major livestock categories in 1997. EPA estimates that only a small subset of these AFOs would be regulated as CAFOs, because most would not meet the size definitions or other criteria. More information is provided in Section 3 of this report.

Table 1-1. Number of Total AFOs and AFOs *Defined* as CAFOs (1997)

Sector	Total AFOs	Defined CAFOs
Beef operations, including both cattle, veal, and heifer operations	21,807	2,431
Dairy operations (milk production operations only)	94,787	3,399
Hog operations, including both "farrow-finish" and "grow-finish" operations [a/]	51,772	5,409
Poultry operations, including broilers, layers (wet and dry operations), turkeys [b/]	27,530	3,739
Total AFOs	**237,821** [c/]	**14,978**

See Section 3.

[a/]Grow-finish operations finish more mature pigs while farrow-finish operations handle all stages of production from breeding to finishing.

[b/] Use either liquid or dry manure handling systems present at the facility.

[c/] USDA estimate of the total number of AFOs is adjusted for specialty cases. Specialty cases (estimated at 2,291 operations) are dairies that went out of business in 1997, swine operations with feeder pigs only, and egg-hatching operations.

1.2 SUMMARY OF THE PROPOSED RULEMAKING

1.2.1 The 2001 Proposal

On January 12, 2001 (66 FR 2959), EPA published proposed revisions to the existing effluent guidelines for CAFOs (40 CFR Part 412) and to certain provisions of the NPDES regulations applicable to CAFOs. Effluent guidelines and standards for CAFOs establish the technology-based effluent discharge and performance standards for both existing and new sources for each of the beef, dairy, swine, and poultry subcategories. The NPDES permit program for CAFOs defines which AFOs are CAFOs and need to obtain NPDES permits, and it establishes the specific requirements that must be complied with under a permit. These two existing interrelated regulations affecting CAFOs were originally promulgated in the 1970s.

An overview of the ELG options and NPDES scenarios is provided in Table 1-2. For more detailed information, see Sections 7 and 8 of the preamble to EPA's proposed rule (66 FR 2993-3061).

1.2.1.1 NPDES Permit Regulation

Under the current NPDES regulations for CAFOs, a three-tier structure is used to determine which AFOs also meet the criteria under which they are considered CAFOs. Under the current NPDES structure, (1) all AFOs with more than 1,000 AU are automatically defined as CAFOs; (2) AFOs with 301 to 1,000 AU are defined as CAFOs only if they meet certain conditions; and (3) AFOs with 301 to 1,000 AU that do not meet these conditions, and all AFOs with fewer than 300 AU are CAFOs only if they are designated as such by the permitting authority. (See 40 CFR 122.23 and Part 122, Appendix B).

EPA proposed several alternatives for revising the existing CAFO definition. Under one scenario, the current three-tier structure would be retained, but there would be certain changes to the conditions

that define an operation as a CAFO in the middle tier (300 AU to 1,000 AU). EPA also proposed an alternative regulatory approach that would replace the existing three-tier structure with a two-tier scenario for defining operations as CAFOs. Under the "two-tier" scenario, all AFOs with more than a specified number of animals would be defined as a CAFO. EPA considered several potential thresholds that could be set under the two-tier scenario.

EPA also proposed to revise the definition of a CAFO to expressly include chicken operations using dry litter management techniques, swine nurseries, and heifer operations. EPA proposed to explicitly address manure application on land under the control of a CAFO and considered alternatives for collecting information regarding manure transferred to off-site locations. The proposed rule included certain changes affecting which entities would be required to obtain NPDES permits. It also contained provisions requiring that a CAFOs that ceases operation must retain its NPDES permits until all wastes generated by the operation no longer have the potential to reach waters of the United States.

Table 1-2 summarizes the scope options that EPA considered during the development of the 2001 Proposal. For more information on the proposed changes to the NPDES regulations, see Section 7 of the proposed rule preamble (66 FR 2993-3050).

1.2.1.2 Effluent Limitations Guidelines and Standards

Under the current effluent guidelines regulations, CAFOs are prohibited from discharging process wastewater, except when rainfall events cause an overflow from a facility designed, constructed, and operated to contain all process-generated wastewater plus the runoff from a 25-year, 24-hour rainfall event.

EPA proposed requiring all existing and new CAFOs spreading manure on cropland to limit the application rate to the nitrogen needs of the crops and, for those fields where additional constraints are considered necessary, to ensure that the manure application rate would not exceed the phosphorus needs of the crops.

EPA also proposed requiring all existing beef and dairy operations to implement controls (retrofitting of lagoons and ponds with impervious liners) to minimize leaching to ground water if the ground water beneath the production area has a direct hydrologic connection to surface water. EPA proposed requiring all existing swine, veal, and poultry CAFOs to eliminate all discharges from the animal production area (thereby eliminating for these sectors the effluent guidelines provision that allows for certain overflows due to chronic or catastrophic rainfall).

EPA proposed that newly constructed CAFOs should meet the same requirements as those proposed for existing CAFOs, except that new swine, veal, and poultry operations also would need to implement ground water controls where there is a direct hydrologic connection to surface water.

Table 1-2 summarizes the ELG options that EPA considered for the 2001 Proposal. For more information on the proposed technology options, see section 8 of the proposed rule preamble (66 FR 3050-3070). Section 8 of the preamble also describes certain other technology options that EPA considered at proposal, such as prohibiting manure application on frozen, snow-covered, or saturated ground; requiring use of anaerobic digester systems; composting; and surface water monitoring requirements.

1.2.2 The 2001 Notice of Data Availability

On November 21, 2001, EPA published a Notice of Data Availability (referred to as the "2001 Notice") that presented a summary of new data and information submitted to EPA during the public comment period on the proposed CAFO regulations, including data received from the U.S. Department of Agriculture (66 FR 58556). There were four main components to the Notice: (1) discussion of new data and changes EPA was considering to refine its cost and economics model; (2) discussion of new data and changes EPA was considering to refine its nutrient loading and benefits analysis; (3) new data and changes EPA was considering to the proposed NPDES permit program regulations; and (4) new data and changes EPA was considering to the proposed ELG regulations. See USGPO, 2001b. The 2001 Notice also discussed options that the Agency considered to enhance flexibility for the use of State NPDES and non-NPDES CAFO programs, including implementation of environmental management systems (EMS).

1.2.3 The 2002 Notice of Data Availability

On July 23, 2002, EPA published a Notice of Data Availability (referred to in this report as the "2002 Notice") that presented a summary of new data and information submitted to EPA during the public comment period on the proposed CAFO regulations, including data received from the 2001 notice (67 FR 48099). There were three main components of the 2002 Notice: (1) establishing alternative regulatory thresholds for chicken operations using dry litter management practices; (2) the potential creation of alternative performance standards to encourage CAFOs to implement new technologies; and (3) financial data and changes EPA considered to refine its economic analysis models. See USGPO, 2002. The 2002 Notice made these data and potential changes available for public review and comment.

1.3 SUMMARY OF THE FINAL REVISIONS

Below is a brief summary of the major elements of this final rule and a brief index on where each of the requirements is located in the final regulations. Part 122 of the Code of Federal Regulations (Title 40) contains the regulations for the National Pollutant Discharge Elimination System (NPDES) permit program. These NPDES Regulations include requirements that apply to all point sources, including CAFOs. Part 412 is the location in the Code of Federal Regulations where the national effluent guidelines are located for CAFOs. This summary is not a replacement for the actual regulations and is not for interpretive purposes. More information is in the preamble to the final rule.

1.3.1 NPDES Permit Regulations

Overall, the final rule maintains many of the basic features and the overall structure of the 1976 NPDES regulations with some important exceptions. First, all CAFOs have a mandatory duty to apply for an NPDES permit, which removes the ambiguity of whether a facility needs an NPDES permit, even if it discharges only in the event of a large storm. In the event that a Large CAFO has no potential to discharge, the final rule provides a process for the CAFO to make such a demonstration in lieu of obtaining a permit. The second significant change is that large poultry operations are covered, regardless of the type of waste disposal system used or whether the litter is managed in wet or dry form. Third, under this final rule, all CAFOs covered by an NPDES permit are required to develop and implement a nutrient management plan. The plan would identify practices necessary to implement the ELG and any

other requirements in the permit and would include requirements to land apply manure, litter, and process wastewater consistent with site specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients.

Table 1-2. Summary of Options and Scenarios Considered by EPA

Technology Options	
Option 1:	N-based land application controls and inspection and recordkeeping requirements for the production area
Option 2	Same as Option 1, but restricts the rate of manure application to a P-based rate where necessary (depending on specific soil conditions at the CAFO)
Option 3	Adds to Option 2 by requiring the operation to perform ground water monitoring and controls unless it can show that the ground water beneath manure storage areas or stockpiles does not have a direct hydrologic connection to surface waters
Option 4	Adds to Option 3 by requiring sampling of surface waters adjacent to the production area and/or land under control of the CAFO to which manure is applied
Option 5	Adds to Option 2 by establishing a zero discharge requirement that does not allow for an overflow from the production area under any circumstances
Option 6	Adds to Option 2 by requiring that large hog and dairy operations install and implement anaerobic digestion and gas combustion to treat their manure
Option 7	Adds to Option 2 by prohibiting manure application to frozen, snow-covered or saturated ground
Regulatory Scope Options	
Scenario 1	Retains existing 3-tier framework and establishes additional requirements
Scenario 2	Same as Scenario 1, except that operations with 300-1,000 AU would be subject to the regulations based on a revised set of conditions at the feedlot site
Scenario 3	Same as Scenario 2, but allows an operation with 300-1,000 AU to either apply for an NPDES permit or to certify to the permit authority that it does not meet any of the conditions and thus is not required to obtain a permit
Scenario 4a	Establishes 2-tier framework and applies ELG standard to all operations with more than 500 AU
Scenario 4b	Establishes 2-tier framework and applies ELG standard to all operations with more than 300 AU
Scenario 5	Establishes 2-tier framework and applies ELG standard to all operations with more than 750 AU
Scenario 6	Retains existing 3-tier framework and establishes a simplified certification process

1.3.2 Effluent Limitations Guidelines and Standards

The final ELGs will continue to apply to only CAFOs with more than 1,000 AU, although the requirements for existing sources and new sources are different for certain animal sectors. In the case of existing sources, the ELGs will continue to prohibit the discharge of manure and other process wastewater pollutants, except for allowing the discharge of process wastewater whenever rainfall events cause an overflow from a facility designed, constructed, and operated to contain all process wastewaters plus the runoff from a 25-year, 24-hour rainfall event. The ELGs also require land application at the CAFO must be at rates that minimize phosphorus and nitrogen transport from the field to surface waters in compliance with technical standards for nutrient management established by the Director. The ELGs also establish certain best management practice (BMP) requirements that apply to the production and land application areas.

For new large beef and dairy operations, the ELGs establish production area requirements that are the same as those for existing sources. In the case of large swine, veal, and poultry operations that are new sources, a new zero discharge standard is established. The rule also clarifies that where waste management and storage facilities are designed, constructed, operated and maintained to contain all manure, litter and process wastewater, including the runoff and direct precipitation from a 100-year, 24-hour rainfall event, and is operated in accordance with certain other requirements, this will satisfy the new standard. Land application requirements for both groups are identical to those established for existing sources.